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| APPLICATION NO.   | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|------------------|
| 10/673,513  | 09/30/2003  | David L. O'Meara     | 243460US6YA         | 1655             |
| 22850   | 7590        | 02/14/2006           |                     | EXAMINER         |
| OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C.<br>1940 DUKE STREET<br>ALEXANDRIA, VA 22314 |             |                      | COLEMAN, WILLIAM D  |                  |
|   |             |                      | ART UNIT            | PAPER NUMBER     |
|   |             |                      | 2823                |                  |

DATE MAILED: 02/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

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|                              |                  |                |
|------------------------------|------------------|----------------|
| <b>Office Action Summary</b> | Application No.  | Applicant(s)   |
|                              | 10/673,513       | O'MEARA ET AL. |
|                              | Examiner         | Art Unit       |
|                              | W. David Coleman | 2823           |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 30 November 2005.
- 2a) This action is FINAL.                    2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-56 is/are pending in the application.
- 4a) Of the above claim(s) 39-56 is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1-18,20-22 and 24-38 is/are rejected.
- 7) Claim(s) 19 and 23 is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All    b) Some \* c) None of:
  1. Certified copies of the priority documents have been received.
  2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 01/06.
- 4) Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) Notice of Informal Patent Application (PTO-152)
- 6) Other: \_\_\_\_\_.

**DETAILED ACTION**

***Response to Arguments***

1. Applicant's arguments filed November 30, 2005 have been fully considered but they are not persuasive.
2. Applicants amendment to claim 1 which now includes the limitation of "monitor a state of a material deposit on the system component" does not further limit the invention.
3. Applicants contend that neither Rulkens U.S. Patent 6,762,849 B1 herein known as Rulkens and Fairbairn U.S. Patent Application Publication No.: US 2004/0069225 herein known as Fairbairn fail to teach or discloses details of a monitored system component.
4. In response to Applicants contention that Rulkens in view of Fairbairn fails to teach a system component, the Examiner takes the position that since the combined teachings describe forming a layer on a wafer with the wafer being a system component. Because the combined teachings teaches semiconductor manufacturing (column 1, lines 15-22), it would highly suggest the wafer being a semiconductor component as defined by Applicant's disclosure. It is well known that a semiconductor wafer will be comprised of the claimed system components, i.e., quartz, silicon, alumina, carbon or silicon carbide (see column 9, lines 46-59).

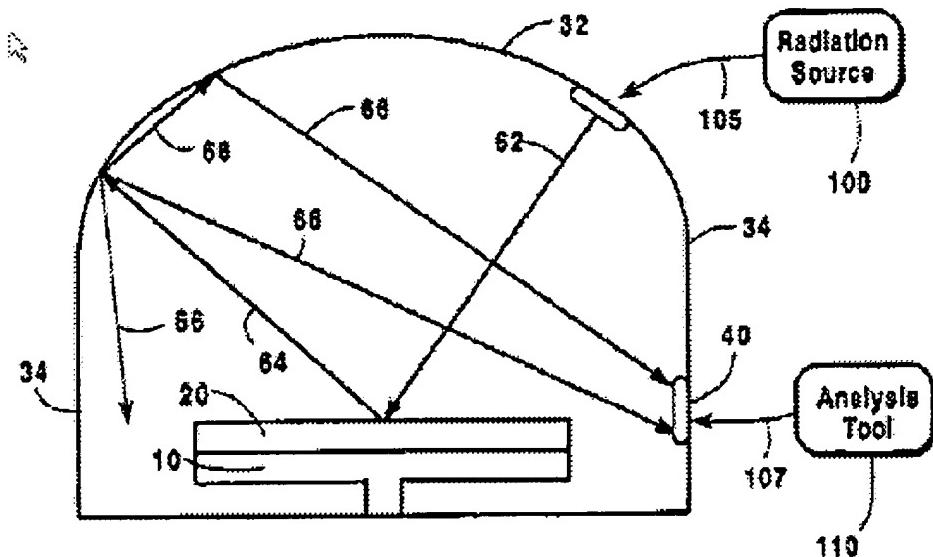
***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

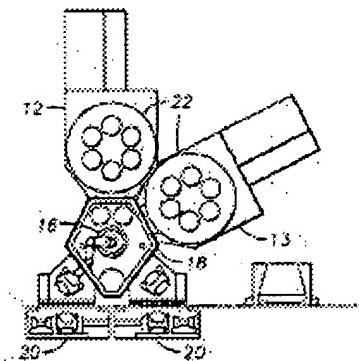
6. Claims 1-18 and 20-22 and 24-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rulkens U.S. Patent 6,762,849 B1 in view of Fairbairn et al., U.S. Patent Application Publication No.: US 2004/0069225 A1.

7. Rulkens discloses a semiconductor process substantially as claimed. See FIGS. 1-7, where Rulkens teaches the following limitations.



this figure is

attributed to Rulkens.



this figure is attributed to Fairbairn.

8. Pertaining to claim 1, Rulkens teaches a method of monitoring status of a system component in a process chamber of a processing system, comprising:  
exposing a system component of the batch type processing system to light from a light source  
105;

and monitoring interaction of the light with the system component 107 to determine a stains of the system component. However, Rulkens fails to teach a batch type processing system.

Fairbairn teaches a batch type processing system. In view of Fairbairn it would have been obvious to one of ordinary skill in the art to incorporate a batch type processing system into the Rulkens semiconductor process because a cluster too configured for batch processing allows multiple wafers to be simultaneously processed in a single chamber [0005].

9. Pertaining to claim 2, Rulkens in view of Fairbairn teaches the method according to claim 1, wherein the exposing comprises:

exposing a system component that is transparent to the light (see Rulkens, column 8, lines 56-64).

10. Pertaining to claim 3, Rulkens in view of Fairbairn teaches the method according to claim 1, wherein the exposing comprises: exposing at least one of a process tube, a shield, a ring, a baffle, and a liner to the light (please note that Rulkens discloses consumable or replaceable components such as alumina, column 1, lines 45-47).

11. Pertaining to claim 4, Rulkens in view of Fairbairn teaches the method according to claim 1, wherein the exposing comprises:

exposing a system component including a ceramic material to the light.

12. Pertaining to claim 5, Rulkens in view of Fairbairn teaches the method according to claim 1, wherein the exposing comprises:

exposing a system component including at least one of an oxide, a nitride, and a carbide to the light (please note that quartz and alumina are composed of oxides).

13. Pertaining to claim 6, Rulkens in view of Fairbairn teach the method according to claim 1, wherein the exposing comprises: exposing a system component including at least one of quartz, Al<sub>2</sub>O<sub>3</sub>, SiN, and SiC to the light.

14. Pertaining to claim 7, Rulkens in view of Fairbairn teach the method according to claim 1, wherein the exposing comprises:  
exposing a system component having a material deposit to the light.

15. Pertaining to claim 8, Rulkens in view of Fairbairn teach the method according to claim 1, wherein the exposing comprises: exposing a system component having a material deposit to the light, the material deposit containing at least one of Si, SiGe, SiN, SiO<sub>2</sub>, doped Si, HfO<sub>2</sub>, HfSiO, ZrO<sub>2</sub>, and ZrSiOx.

16. Pertaining to claim 9, Rulkens in view of Fairbairn teach the method according to claim 1, wherein the exposing comprises:  
using a laser, a LED, a lamp, or a heater for the light source (the Examiner takes the position that the process plasma is the lamp for the light source).

17. Pertaining to claim 10, Rulkens in view of Fairbairn teach the method according to claim 1, wherein the exposing comprises:

exposing a system component to light from a light source positioned outside a chamber processing zone (see alternative process, column 5, lines 3-5).

18. Pertaining to claim 11, Rulkens in view of Fairbairn teach The method according to claim 1, wherein the exposing comprises:

exposing a system component to light from a light source positioned inside a chamber processing zone (see the rejection of claim 9 above for an explanation).

19. Pertaining to claim 12, Rulkens in view of Fairbairn teach the method according to claim I, wherein the exposing comprises: exposing a system component to light having a single wavelength or to light having multiple wavelengths.

20. Pertaining to claim 13, Rulkens in view of Fairbairn teach the method according to claim 1, further comprising:

performing a process in the process chamber.

21. Pertaining to claim 14, Rulkens in view of Fairbairn teach the method according to claim 13, wherein the performing comprises:

performing at least one of thermal process and a plasma process (the thermal process is performed with high intensity discharge lamps as disclosed in column 10, lines25-35).

22. Pertaining to claim 15, Rulkens in view of Fairbairn teach the method according to claim 13, wherein the performing comprises:

performing at least one of a chamber cleaning process, a chamber conditioning process, a substrate etching process, and a substrate film formation process.

23. Pertaining to claim 16, Rulkens in view of Fairbairn teach the method according to claim 13, wherein the performing comprises:

flowing a process gas including a halogen-containing gas during a chamber cleaning process.

24. Pertaining to claim 17, Rulkens in view of Fairbairn teach the method according to claim 13, wherein the performing comprises:

flowing a process gas including at least one of C<sub>1</sub>F<sub>3</sub>, F<sub>2</sub>, NF<sub>3</sub>, and HF during a chamber cleaning process (see Fairbairn [0130]).

25. Pertaining to claim 18, Rulkens in view of Fairbairn teach the method according to claim 13, wherein the performing comprises: flowing a process gas including at least one of a silicon-containing gas and a nitrogen-containing gas during a chamber conditioning process.

26. Pertaining to claim 20, Rulkens in view of Fairbairn teach the method according to claim 13, wherein the performing comprises:

flowing a process gas including a halogen-containing gas during a substrate etching process.

27. Pertaining to claim 21, Rulkens in view of Fairbairn teach the method according to claim 13, wherein the performing comprises: flowing a process gas including HF during a substrate etching process (see Fairbairn [0135]).

28. Pertaining to claim 22, Rulkens in view of Fairbairn teach the method according to claim 13, wherein the performing comprises: flowing a process gas including at least one of a silicon-containing gas and an nitrogen-containing gas during a substrate film formation process.

29. Pertaining to claim 24, Rulkens in view of Fairbairn teach the method according to claim 13, wherein the performing comprises:  
flowing a process gas including a metal-containing gas during a substrate film formation process (i.e., tungsten).

30. Pertaining to claim 25, Rulkens in view of Fairbairn teach the method according to claim 13, wherein the performing further comprises:  
flowing an inert gas including at least one of Ar, He, Ne , Kr, Xe, and N<sub>2</sub>.

31. Pertaining to claim 26, Rulkens in view of Fairbairn teach the method according to claim 13, wherein the performing comprises: exposing a system component to a temperature between about 100°C and about 1000°C (the Examiner takes the position that it is well known to form dielectrics in the claimed temperature range).

32. Pertaining to claim 27, Rulkens in view of Fairbairn teach the method according to claim 13, wherein the performing comprises: exposing a system component to a pressure between about 10 mTorr and about 760 Torr (because Rulkens discloses forming a plasma it is well known that plasmas are formed below 760 Torr).

33. Pertaining to claim 28, Rulkens in view of Fairbairn teach the method according to claim 13., wherein the performing comprises:  
exposing a quartz system component to chamber pressure of about 200 mTorr and a temperature of about 300°C during a chamber cleaning process.

34. Pertaining to claim 29, Rulkens in view of Fairbairn teach The method according to claim 1, wherein the exposing comprises: exposing a quartz system component including a SiN protective coating and a metal oxide material deposit to the light during a chamber cleaning process.

35. Pertaining to claim 30, Rulkens in view of Fairbairn teach the method according to claim 1, wherein the monitoring comprises:  
using an optical monitoring system to detect intensity of light transmission from the system component.

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36. Pertaining to claim 31, Rulkens in view of Fairbairn teach the method according to claim 30, wherein the monitoring further comprises: determining if an intensity level of the light transmission from the system component has reached a threshold value.

37. Pertaining to claim 32, Rulkens in view of Fairbairn teach the method according to claim 31, wherein the monitoring further comprises:

measuring the intensity level of the light transmission component to arrive at a determination of whether to stop the process.

38. Pertaining to claim 33, Rulkens in view of Fairbairn teach the method according to claim 1, wherein the monitoring comprises:

using an optical monitoring system to detect intensity of light reflection from the system component.

39. Pertaining to claim 34, Rulkens in view of Fairbairn teach the method according to claim 33, wherein the monitoring further comprises: determining if an intensity level of the light reflection has reached a threshold value.

40. Pertaining to claim 35, Rulkens in view of Fairbairn teach the method according to claim 34, wherein the monitoring further comprises: measuring the intensity level of the light reflection to arrive at a determination of whether to stop the process.

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41. Pertaining to claim 36, Rulkens in view of Fairbairn teach the method according to claim 1, further comprising:

forming a protective coating on a system component.

42. Pertaining to claim 37, Rulkens in view of Fairbairn teach the method according to claim 36, wherein the forming a protective coating comprises:

forming at least one of SiN, SIC, SiO<sub>2</sub>, YzO<sub>3</sub>, SczO<sub>3</sub>, SczF3, YF3, La203, CeO<sub>2</sub>, Lu203, Dy03, SiO<sub>2</sub>, MgO, Al203, ZnO, SnO<sub>2</sub>, and InzO<sub>3</sub>.

43. Pertaining to claim 38, Rulkens in view of Fairbairn teach the method according to Claim 1, wherein the monitoring comprises:

using an optical monitoring system to detect said interaction of the light; and purging optical components of said monitoring system with a purge gas.

44. Claims 19 and 23 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

*Information Disclosure Statement*

The information disclosure statement filed January 20, 2006 has been considered.

*Conclusion*

45. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).
46. A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.
47. Any inquiry concerning this communication or earlier communications from the examiner should be directed to W. David Coleman whose telephone number is 571-272-1856. The examiner can normally be reached on Monday-Friday 9:00 AM - 5:30 PM.
48. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matt Smith can be reached on 571-272-1907. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

49. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



W. David Coleman  
Primary Examiner  
Art Unit 2823

WDC